

DEPARTMENT OF ENVIRONMENTAL QUALITY
Permitting and Compliance Division
Solid Waste Program
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1620 E. Sixth Avenue
Helena, MT 59620-0901

ENVIRONMENTAL ASSESSMENT (EA)

1.0 Division/Bureau:

Permitting and Compliance Division, Waste and Underground Tank Management Bureau, Solid Waste Management Section.

2.0 Project or Application:

Fallon County applied to the Department of Environmental Quality (MTDEQ) for an expansion of their existing licensed boundaries of their Class II solid waste landfill (Coral Creek Landfill). Fallon County currently operates the Coral Creek Class II Landfill under license number 328 in accordance with the State of Montana Solid Waste Management Laws and Rules.

The Coral Creek landfill has been licensed and receiving waste since 1993. The County applied for a license revision to expand the Coral Creek Landfill, and also submitted a no-migration petition for the expansion area, both of which were approved. Due to this approval the Department has waived the groundwater monitoring and liner requirements for the proposed expansion.

The expansion proposal is to add approximately 640 acres of city-owned land immediately east of the existing facility to the licensed area (Figure 2). Even though the city proposes to license the entire section, the expansion proposal will only use approximately 14 acres immediately adjacent to the current landfill for waste disposal. The other 626 acres will be reserved for future expansion of the fill area and other facility activities. Added to the existing 19-acre fill area this will produce a total fill area of approximately 33 acres and a total licensed area of approximately 720 acres.

At the current rate of waste disposal, approximately 12,000 tons of waste per year, the design capacity of the currently licensed area along with the proposed expansion will allow the facility to operate for approximately 35 more years.

3.0 Description of Project:

3.1 Site Location — The existing landfill is located approximately seven miles southeast of Baker on Coral Creek Road, (Figure 1). It consists of 80 leased acres in the E½ of Sec. 15, Township 6 North, Range 60 East. The county has purchased and proposes to license all of Section 14, Township 6 North, Range 60 East, abutting the east side of the current landfill.

3.2 Site Topography — The area is typical southeastern Montana prairie, with benches, coulees and low hills. This gently sloping to rolling area contains scattered buttes and badlands. It sits on heavy clay soils and consists of mostly dry shrub and mixed grass prairies. It receives very little precipitation and is interspersed with woody draws that contain ponderosa pine, cedar and snowberry. Agricultural practices can be found throughout the area that also supports many dry land native wildlife species such as antelope, mule deer and sage-grouse.

3.3 Existing licensing conditions - Fallon County is authorized under their existing license to dispose of solid waste into cells that have been constructed without a liner or groundwater monitoring based on an approved no-migration petition. An approved no-migration petition allows the Department to waive liner and groundwater monitoring requirements is based on a demonstration by the facility that the site conditions do not have the potential to contaminate the uppermost aquifer under the site during the life of the facility and for the 30-year post closure period.

3.4 Landfill Features — The waste disposal areas are the dominant features of the landfill. The current facility has approximately 19 acres licensed for Class II disposal with approximately 8 acres currently being filled with waste. The predominant features in the proposed area will be new disposal cells. Other features in the proposed expansion area located adjacent to the Class II landfill disposal cells will be developed for other landfill features such as leachate ponds, stormwater management ponds, white goods and scrap metal storage, borrow, cover stockpile areas, tire disposal and the burn pit.

3.3.1 *Waste Disposal Cells* — After the landfill cells have reached their design capacity, they will be closed with a standard final cover, consisting of 18 inches of compacted clay, 12-inches of soil for frost protection, and 6-inches of topsoil. The surface will be graded for drainage and to blend into the existing topography, and be vegetated. The level of the finished cover over the waste will be an average of 30 feet higher than the current ground level.

3.3.2 *Cell Construction* — A master plan has been developed for the phased filling of approximately 14 acres. The proposed expansion area will be constructed in four phases, the contiguous body of the waste mass will eventually tie together into a single mounded fill area. All four waste cells will be drained by one leachate removal sump and capped by one continuous final cover. The cells will be excavated to an average of 40 feet below the current ground surface. The interior cell side slopes will be 4:1 or less. The floor of the cells will consist of native on-site material, re-compacted if necessary, to a permeability of 1×10^{-7} centimeters per second or less. The floor beneath all contiguous disposal-units are designed to have an average five percent slope and drain to the leachate collection sump at the lowest base elevation of the proposed expansion area, which is on the southeastern side of the proposed expansion area.

3.3.3 *Leachate Control* — The leachate removal system will consist of two 6-inch diameter perforated high-density polyethylene (HDPE) lateral collection pipes, bedded in gravel, and will discharge to a manhole sump. A single 6-inch diameter double-walled HDPE removal pipe will drain the manhole sump and discharge by gravity flow to a composite-lined leachate evaporation pond on the southeast side of the expansion area. If necessary to maintain adequate capacity in

the leachate pond, excess leachate will be pumped and hauled to the local wastewater treatment plant. The manhole will allow monitoring of leachate depth on the liner, which may not exceed 1 foot, and removal of leachate if necessary.

3.3.4 *Stormwater Control* — No water that flows through or contacts waste will be allowed to mix with stormwater. The plans call for ditches around the perimeter of the area to divert stormwater to a permanent storm-water and sediment detention pond. This pond will be designed to capture all sediment and runoff from the active area from a 24-hour, 25-year storm.

In order to prevent the increase of sediment load in the stormwater runoff generated from the proposed expansion, the facility will follow best management practices for erosion and drainage control. Berms and ditches will route surface water away from the disposal area. Interior roads will have bar ditches and culverts to aid in surface water control. Covered disposal areas will have positive drainage so that surface run-off will not pond over the waste or infiltrate the area where waste is being placed. Surface run-off from the covered disposal areas, borrow areas, and materials handling areas will be routed to the stormwater pond where it will be held until it evaporates.

In the event that the storage capacity of the stormwater pond is exceeded and the facility needed to discharge surface waters, stormwater discharge permits will be required. Prior to obtaining a stormwater discharge permit; samples will have to be taken to assure that the discharge will meet the requirements of the Montana Pollution Elimination Discharge System. Sampling will have to be done prior to any discharge or, if there is an unplanned discharge, during the discharge.

3.3.5 *Other Disposal Areas & Temporary Storage Areas* — The expansion area also includes a six acre area that will contain four trenches for asbestos disposal and a stockpile area for wood chips and tires. The procedures for handling these wastes is already outlined in the current operation and maintenance plan for the facility.

3.3.6 *Gate House & Equipment Storage Buildings* — The existing entrance, buildings and access roads will be used during operation of the expansion area.

3.3.7 *Soil Stockpiles* — The soil excavated from the expansion and borrow areas will be stockpiled and used for daily and intermediate cover. Material suitable for the final cover topsoil will be stockpiled separately. All topsoil stockpiles will be seeded until used, to prevent run-off, erosion and undue disturbance of microbial soil organisms.

3.4 Operation and Maintenance Plan

3.4.1 *Personnel* — Fallon County will continue to operate the landfill. Operations at the facility will follow the proposed O&M Plan for waste acceptance and screening, disposal, leachate management, stormwater control, methane monitoring, and final cover. The Department inspects the facility on a regular basis to ensure compliance with the approved procedures.

The landfill is staffed with two full-time employees whenever it is open. All incoming loads are weighed. No additional employees are expected to be needed to operate the proposed expansion.

3.4.2 *Operating Hours* — The landfill is not open to the general public. The current and proposed landfill hours are 7:30 AM to 3:30 PM Monday through Friday. It will be closed on Saturdays, Sundays and legal holidays.

3.4.3 *Acceptable Wastes* — Signs at the facility list the acceptable wastes. The facility currently receives approximately 12,000 tons of Groups II, III, and IV waste per year from all of Fallon and Wibaux Counties, Ekalaka and areas of Bowman and Beach, North Dakota. Group II wastes include decomposable wastes and mixed solid wastes containing decomposable materials, but exclude regulated hazardous waste. Group III wastes include wood wastes and non-water soluble solids. This includes, but is not limited to, brick, rock, dirt and concrete, wood materials, and tires. Group IV wastes include construction and demolition debris and asphalt.

3.4.4 *Special and Hazardous Wastes* — The facility does not accept hazardous waste, other than household hazardous waste, junk vehicles, liquid waste, PCB waste, radioactive waste, auto batteries, antifreeze, sewage sludge, asphalt, incinerator ash, or infectious medical waste. The workers implement a waste screening program which includes conducting random load inspections to assure compliance with rules regarding hazardous waste, Freon removal, hot loads, liquid wastes and other prohibited materials. If unacceptable or hazardous wastes are found the customer is instructed to remove the material and dispose of it at an appropriate facility. Dead animals are placed in an excavated area of the active area of the landfill and buried immediately. The facility also accepts slaughterhouse wastes. These wastes are composted using the static pile method in a separate area of the landfill.

The facility accepts used motor oil from home mechanics and private users. This oil is collected in town, transported to the landfill, and stored in tanks in a diked area adjacent to the equipment building. It is used for heating fuel.

3.4.5 *Daily Landfill Operations* — Operation of the landfill will not change if the expansion is approved. Workers direct the placement of waste and compact the waste and cover it with at least six inches of earthen material at the end of each day. The operators maintain intermediate cover of at least 12 inches of earthen material on areas that will not receive waste for 90 days. They maintain stormwater controls, access roads, and the materials handling areas.

3.4.6 *Soil Excavation* — The excavation for the first phase of the expansion will be about 92,000 cubic yards of soils and weathered shale. The excavation for the entire expansion will be about 316,000 cubic yards of soil with an additional 154,500 cubic yards being used from the soil borrow area. Due to topographic irregularities the average cut depth will be approximately 20 feet and the average fill depth, including six feet of final cover, will be approximately 50 feet. Excavated material suitable for plant growth will be stockpiled separately. Other excavated material will be stockpiled and used for daily and intermediate cover.

3.4.7 *Litter and Access Control* — Every ten years, as the landfill expands to each new disposal phase, much of the filling will occur below grade, out of the wind. This will aid in litter

control. In addition, moveable screens and the fence around the site will catch windblown litter. The fence surrounding the site will be hog-wire on the bottom with two strands of barbed wire above. The lower hog-wire portion will likely catch much of the wind-blown litter. All incoming loads are required to be tarped and workers regularly patrol the area to gather litter that is not caught by the fences.

Operators will be on duty whenever the site is open. The gate will be locked when the facility is closed. Signs are used throughout the landfill to direct people to dumping areas and to the segregated materials areas. Signs also inform the users of fees and unacceptable wastes.

3.4.8 Severe Weather Operation — The operators will maintain a wet-weather area for dumping during muddy conditions. After conditions improve, the waste will be moved to the active burial cell.

3.4.9 Contingency Planning — The landfill plan of operations has contingency plans for unusual situations. Incoming loads containing hot materials are directed to a dumping area where the load can be extinguished before being placed in the landfill. If a landfill fire occurs, the burning wastes will be separated from the cell working face and extinguished by covering it with earthen material.

Any non-acceptable wastes not sent back with the customer will be set aside until a specialist firm dealing in the handling of that type of waste could be contacted to come in and remove the material. In the event of any hazardous waste spills, the area will be isolated and a specialty contractor will be called in to remediate the spill.

4.9 Benefits and Purpose of the Proposal

The objective of the proposal is to continue to provide cost effective solid-waste disposal for residents of Fallon County and neighboring areas. Expanding the existing landfill appears to be in the best interest of the residents because it is generally more cost effective and efficient to maintain an active landfill as long as possible rather than open a new site. The proposed expansion will extend the life of the facility by approximately 35 years.

In addition, an expansion at the current site could offer savings in other areas. There are a number of costly requirements relating to post-closure care. Typically, a Class II landfill site must be monitored for 30 years after it is closed. Remedial action could be necessary to repair the final cover and monitor and clean up any ground-water contamination. Expanding the existing landfill will allow some closure responsibilities to be integrated with operations and more importantly, minimize the number of locations requiring 30-year post-closure care.

The site is close enough to town to keep hauling costs down, but not close enough to generate complaints that could arise from a landfill operation. Historically, because of the remote location, few complaints have been raised concerning litter, odors, dust or operations. Geologically and hydrogeologically the site appears adequate. There are no problems at the site requiring remedial action at this time.

5.0 Description and analysis of reasonable alternatives whenever alternatives are reasonably available and prudent to consider.

The Department considered two alternatives in the preparation of this EA:

5.1 Alternative I — Approve the expansion as proposed by the applicant. Because of the 12 years of filling at this site and the large space remaining for expansion, and since this site has been able to comply with the Subtitle D Regulations that have been implemented throughout the 1990's, the continued use of this site is a practical and economically advantageous option.

5.2 Alternative II — Not approve the license area expansion — the "no action alternative". If this alternative were chosen, the applicant will have to either:

1. Locate another landfill to accept the County waste when the current cell reaches capacity. The nearest Class II landfill is in Glendive, 71 miles to the west. If the waste had to be hauled to Glendive for disposal, there will be additional costs for transportation as well as the tipping fees imposed by the Glendive landfill. These additional costs will likely cause a significant increase in total disposal costs to Fallon County area residents.
2. Spend a large amount of time and money to locate, study and license another site suitable for a Class II landfill in Fallon County.

The County SW district concluded that Alternative I was the most practical and economically advantageous option of the two alternatives.

Site selection is a local government responsibility. The Department's authority is to examine the license application to evaluate the natural site conditions, facility design, and operations and maintenance plan, to assess the proposed facility's compliance with state laws and regulations.

6.0 A listing and appropriate evaluation of mitigation, stipulations and other controls enforceable by the agency or another government agency.

The proposed expansion must meet the minimum requirements of the Montana Solid Waste Management Act and administrative rules regulating solid waste disposal. In addition, the facility must comply with Air and Water Quality Acts and associated administrative rules as well as County ordinances. Obtaining the necessary approvals and compliance required by these laws and regulations should minimize any adverse environmental effects.

The facility will continue to operate under the updated guidelines in the approved Operations and Maintenance Plan, will only accept Group II, III, and IV wastes; not accept bulk liquids; have all future design and operations changes receive prior approval from the Department; never allow more than 12 inches of leachate to accumulate in the bottom of the waste cells; monitor for methane gas collecting in buildings or leaving the disposal site; apply for and obtain annual open burning permits from the Department's Air Resources Management Bureau; and be inspected annually by a licensed professional engineer when updating the closure and post closure plans.

Closure will be completed under the approved Closure/Post-Closure Plan. Financial assurance for the site will be updated prior to initial placement of waste in the new disposal area.

7.0 Recommendation

The Montana Department of Environmental Quality is requesting input from the public regarding this proposal.

If there are no adverse public comments identifying environmental problems or significant impacts that have not been addressed in the EA, the Department intends to issue a license for the expansion of the Fallon County Class II facility.

8.0 If an EIS is needed, and if appropriate, explain the reasons for preparing the EA

The Department finds that an Environmental Impact Statement is not needed.

9.0 If an EIS is not required, explain why the EA is an appropriate level of analysis:

The Department finds that construction and operation of the proposed Coral Creek landfill expansion will not significantly affect the quality of the human environment. Potential impacts to surface water resources, terrestrial and aquatic life, vegetation and other aspects of the physical and human environment are expected to be minor. Potential impacts to the ground water and surface water resources will be minimal due to the low average annual precipitation, relatively impermeable material beneath the proposed expansion area and engineering controls designed for the proposal. An Environmental Assessment is an adequate document to address potential impacts of the proposed landfill expansion.

10.0 Other groups or agencies contacted or which may have over-lapping jurisdiction:

Fallon County
Montana Natural Heritage Program
Montana Historical Society

11.0 Individuals or groups contributing to this EA:

Entranco Engineers, Inc., Helena, MT

12.0 EA prepared by:

Colin McCoy and Tim Stepp, Permitting and Compliance Division, Waste and Underground Tank Management Bureau, Solid Waste Program

Date: August 7, 2007

Potential Impacts on the Physical Environment

RESOURCE	LEVEL OF IMPACT					
	Major	Moderate	Minor	None	Unknown	Appendix
1. Terrestrial and Aquatic Life and Habitat			X			X
2. Water Quality, Quantity, and Distribution			X			X
3. Geology and Soil Quality, Stability and Moisture			X			X
4. Vegetation Cover, Quantity and Quality			X			X
5. Aesthetics			X			X
6. Air Quality			X			X
7. Unique, Endangered, Fragile or Limited Environmental Resources					X	X
8. Demands on Environmental Resources of Water, Air, and Energy			X			X
9. Historical and Archaeological Sites					X	X

CUMULATIVE AND SECONDARY IMPACTS — The overall impact of the proposed facility expansion is anticipated to be minor. The potentially significant impact associated with this site is the possibility of leachate migration to the underlying ground water aquifer.

Potential Impacts on the Human Environment

RESOURCE	LEVEL OF IMPACT					
	Major	Moderate	Minor	None	Unknown	Appendix
1. Social Structure and Mores				X		
2. Cultural Uniqueness and Diversity				X		
3. Local and State Tax Base and Tax Revenue			X			X
4. Agricultural or Industrial Production			X			X
5. Human Health				X		X
6. Access to and Quality of Recreational and Wilderness Activities				X		
7. Quantity and Distribution of Employment			X			X
8. Distribution of Population				X		
9. Demands for Government Services			X			X
10. Industrial and Commercial Activity			X			X
11. Locally Adopted Environmental Plans and Goals				X		

CUMULATIVE AND SECONDARY IMPACTS — The expansion of the Class II landfill in the proposed location is anticipated to have very minor impacts on the human environment. The increased employment that may be generated by the construction of the expansion will have a minor, but positive effect on the tax base of the County. Open burning on the site will only be conducted after obtaining permits from the Department and the County and will only be permitted on days that have good ventilation so that any impacts are expected to be minor.

APPENDIX

EVALUATION OF POTENTIAL ENVIRONMENTAL IMPACTS RELATED TO THE PROPOSED FACILITY

This section evaluates potential environmental effects that could occur if the expansion is licensed. **Bolded headings I and II** correspond to Tables 1 and 2. The number on each of the underlined resource headings corresponds to one of the resources listed in the tables. Generally, only those resources potentially affected by the proposal are discussed. If there is no effect on a resource, it may not be mentioned in the appendix.

Direct and indirect impacts are those effects that occur in or near the proposed project area and might extend over time. Often, the distinction between direct and indirect effects is difficult to define, thus in the following discussion, impact or effect means both types of effects. Cumulative impacts are restricted to the net effects of the proposed project because no other known projects are proposed in this area. Secondary impacts are induced by a direct impact and occur at a later time or distance from the triggering action. No secondary impacts are expected.

I. Potential Impacts of the Proposed Project on the Physical & Biological Environments (see Table 1)

1.0 Terrestrial and Aquatic Life and Habitats

The proposed expansion site is a gently sloping to rolling area that contains scattered buttes and bad-lands. It sits on heavy clay soils and consists of mostly dry shrub lands and mixed grass prairies. It receives very little precipitation and is interspersed with woody draws that contain ponderosa pine, cedar and snowberry. Any aquatic life will be eliminated from areas that are proposed for use by the facility. With no continuously active aquatic systems within the boundary of the proposed expansion, it is unlikely there is significant aquatic life or habitat on the site. Any impacts to aquatic life will likely be minor because it is primarily an upland area.

Pronghorn antelope, mule deer, sage grouse, jackrabbits, rodents, rattlesnakes and various avian species may use the area. Wildlife forage and habitat is typical of the dry plains of southeastern Montana. Loss of this acreage as wildlife habitat will not be considered critical, as it is not a unique wildlife environment. There is adequate acreage available in the vicinity to accommodate any terrestrial or avian species forced to relocate. Any terrestrial species inhabiting the area proposed for expansion will be permanently displaced by the landfill during the period of operation. After closure the area will be seeded to range grasses. These impacts will be minor and could be positive if the range grasses provide better habitat than the existing vegetation.

A file search by the Montana Natural Heritage Program did not find any records of sensitive plant or animal species or species of concern of any kind in the area of the proposed landfill expansion.

Proper operation of modern sanitary landfills using appropriate daily and intermediate cover minimizes scavenging by birds and mammals. The current landfill does not have undue problems with scavengers and it is anticipated that by continuing good operational practices, the expanded landfill will not have problems with scavengers. By adhering to these practices, impacts to raptors and other birds will be kept to a minimum.

Insects are seldom a problem at a properly operated landfill. Improperly compacted and covered waste may cause increases of nuisance insects and disease vectors, such as mosquitoes and flies. However, this facility's operation plan requirement for covering waste on a daily basis should continue to control any potential problems.

2.0 Geology and soil Quality, Stability and Moisture.

2.1 **Site Characterization Investigation**

The Department determined that the *No-Migration Demonstration*, certified by a qualified ground water scientist, adequately demonstrates that there are no fluid migration pathways that might allow any landfill leachate to escape the waste fill area and reach the uppermost aquifer under the waste or a relevant point of compliance within 30 years of the closure of the facility. Therefore, any impacts to geology, soil quality, stability and moisture are anticipated to be minor.

2.2 **Site Geology**

Eastern Montana has been periodically covered by seas during geologic time. When inland seas covered eastern Montana, mud and sands were transported into the seas by streams. The mud and sands deposited during the last marine inundation now make up the Pierre and Fox Hills formations, respectively. When the seas receded, streams continued to carry sediment into the basin. On recession of the last sea from what is now Montana, streams deposited sand and mud that later became the Hell Creek and Fort Union formations.

The site is regionally situated on the southwestern flank of the Williston Basin, a structural basin centered in northwestern North Dakota that developed from down-warping of the Earth's crust. The basin was active for many millions of years, preserving sediment that over geologic time became rocks. Near the western extent of the basin, stresses associated with mountain building in what is now the Rocky Mountains uplifted rocks along two smaller structures: the northwest southeast – oriented Cedar Creek Anticline and the Poplar Dome. Bedding in bedrock dips away from the axes of Cedar Creek Anticline and Poplar Dome. Regional uplift of the Great Plains and Rocky Mountain area and drainage adjustments, resulting from glaciation, caused streams to down-cut and develop the modern landscape of broad valley floors and low-relief uplands. Erosion of the Fort Union, Hell Creek and Fox Hills formations along the axes of the Cedar Creek Anticline has exposed the Pierre shale (locally called the Bearpaw shale on the Poplar Dome).

The distribution and physical properties of geologic units affect the availability, movement, and quality of ground water. The geologic units in eastern Montana that contain usable groundwater

are unconsolidated alluvial and terrace deposits within the major stream valleys and the sedimentary strata that lie above the Pierre shale. Deep regional aquifers are present beneath the Pierre shale; however, the water in these aquifers is too saline to be used as a potable supply.

The Fort Union Formation contains beds of fine and medium-grained sandstone, siltstone, mudstone, coal and clinker. The Fort Union contains major coal resources in the northern Great Plains. Sandstone and mudstone beds in the Fort Union Formation are as much as 100 feet thick and a few hundred feet to a mile wide. Some coal beds may be continuous across several townships. Many coal beds in the Fort Union have burned along outcrops to form clinker beds of bright red, broken, and fused rocks. Exposed beds of clinker typically cover areas less than one-half square mile, are resistant to erosion, highly permeable to water, and crop out mainly along ridges. Their high permeability and position in uplands make clinker beds ready conduits for ground-water recharge.

The Hell Creek Formation is made up of silty shale, mudstone, fine-and medium-grained sandstones, and few thin coals. The Hell Creek contains less sandstone and coal and more mudstone than the overlying Fort Union Formation. The Hell Creek accumulated by stream deposition in laterally migrating channel belts and on flood plains along the western flank of the Williston Basin.

Aquifer materials within the formation are sandstone beds; the majority of which occurs within the lower third of the unit. These sandstone beds can be as much as 100 feet thick and are continuous or interconnected over many miles. The upper two-thirds of the formation is composed mostly of mudstone with minor amounts of sandstone, and generally acts as a confining bed that impedes water movement between aquifers above and below; the few sandstone beds are less prevalent, thinner, and more discontinuous than in the lower Hell Creek, but locally produce water. The top of the sandstone-dominated portion of the lower Hell Creek Formation defines the top of the Fox Hills-lower Hell Creek aquifer.

This area includes plains and hills formed in residuum and alluvium from shale and sandstone. Some lacustrine sediments also occur. The site is located on the crest of the Cedar Creek anticline, a broad regional structure that overlies significant oil and gas deposits. The Cedar Creek anticline represents the northern geological boundary of the Powder River basin and the southern boundary of the Williston Basin, which both contain younger Cretaceous and Tertiary sedimentary deposits. The core of the anticline is composed of about 900 feet of Cretaceous-aged Pierre shale. The Pierre shale is noted as Bearpaw shale in some publications. The flanks of the anticline expose subsequently younger sedimentary rocks. The Pierre shale is exposed at the surface at the landfill site. The Pierre shale ranges up to 2,100 feet thick in the area, although it is likely somewhat thinner at the landfill site due to erosion after exposure at the top of the anticline. Under the Pierre shale are sedimentary strata that hold the oil and gas deposits.

The Pierre shale is considered a major regional aquiclude. The flanks of the anticline are composed of younger rocks, including the Hell Creek-Fox Hills unit that forms a significant aquifer regionally. Because these units lie on either side of the anticline and dip away from the structure, they have little bearing on the landfill site.

2.3 Site Soils

Four test pits and two test borings in the proposed expansion area show that the soils in the proposed expansion area are the same as those within the existing facility. They are primarily Neldore clay. This soil is on steep to flat slopes and derives from organic-rich marine shale bedrock, in this case, the Pierre shale. The soil does not drain well and is listed by the NRCS as having a percolation rate of 0.32 inches per hour. It is considered to be less than ideal for drain fields, but very good for municipal landfill development due to its very low permeability.

Construction and operation of the proposed facility should not result in soil erosion or the substantial loss of topsoil. Erosion will be minimized through appropriate placement of berms and best management practices such as using straw bales to trap sediment. Any soil material suitable for final cover will be stockpiled on the site and seeded to grasses. This will help retain soil moisture and maintain existing microbial populations until the material could be spread as final cover. Less desirable soil material will be used for daily and intermediate cover.

2.4 Soil Impacts

Construction and operation of the proposed facility should not result in excessive soil erosion or the substantial loss of topsoil. Erosion will be minimized through appropriate use of berms, swales and best management practices such as silt fences and straw bales to trap sediment. Any soil material suitable for final cover will be stockpiled on the site and seeded to grasses. This will help retain soil moisture and maintain existing microbial populations until the material could be spread as final cover during closure. Other borrow material will be temporarily stockpiled, surrounded by silt fences, and used for daily and intermediate cover.

2.5 Geologic Hazards and Constraints

3.0 Water Quality, Quantity and Distribution.

Climate

Elevations range from 2,100 to 4,150 feet. Drainage density is moderate. Mean annual precipitation ranges from 10 to 14 inches, with about 30 percent falling as snow. Design criteria for runoff erosion prevention is based on volumes created by a 24-hour/25 year storm.

3.1 Site Hydrogeologic Characterization Investigation

A site hydrogeologic characterization investigation was not performed for the proposed expansion because a no-migration petition for the landfill was approved by the Department. A site investigation was also considered unnecessary because the site has the same hydrogeological characteristics as and is adjacent to the licensed area on which a no-migration petition has been approved and an environmental assessment has already been written.

3.2 Supply Wells

The nearest well is approximately one-and-a-half miles away and is in the Fox Hills sandstone, which is also the closest water-bearing formation. The static water level in the well is at an elevation of 2,982 feet. The lowest point in the proposed expansion is at an elevation of 3,065 feet. This is a separation of 83 feet vertically and one-and-a-half miles horizontally between the waste and the nearest well water.

3.3 Regional Hydrogeology

The Fox Hills Sandstone and Hell Creek Sandstone are combined to form a major aquifer throughout Eastern Montana. However, the landfill and proposed expansion lie on Pierre Shale and not the Hell Creek or Fox Hills aquifers. The Bearpaw shale which contains massive clayey shales with some calcareous concretions is exposed at the surface over most of the Coral Creek field and is about 900 feet thick. The Newcastle and Dakota Sandstones are at depths of 3800 and 4100 feet respectively and are not economically feasible drinking water sources.

3.4 Site Hydrogeology

The uppermost zone under the landfill site that might carry water is the Judith River formation, which elsewhere in Montana is composed of fine-grained sands and silt deposits. This formation lies at a depth of over 900 feet in the vicinity of the landfill and is known to carry natural gas. Groundwater has been found at various levels in oil wells near the landfill. This groundwater has total dissolved solids ranging from 5,000 to 200,000 milligrams per liter. There might be potable water under the landfill site at depths of over 12,700 feet. The uppermost oil bearing limestone or sandstone beneath the site lies at about 5,200 feet below the surface.

3.5 Ground Water Impacts

The uppermost zone that might carry water is the Judith River formation. This formation lies approximately 900 feet below the surface at the landfill site. Construction and operation of the proposed facility should not deplete groundwater supplies or interfere with groundwater recharge such that there will be a net deficit in available supply, or a significant lowering of the local groundwater table.

Groundwater monitoring at the existing landfill shows that no contamination has resulted from the past 12 years of landfilling.

Ground water impacts are expected to be minor, primarily because of the relatively impermeable material beneath the proposed fill areas.

3.6 Surface Water

The area receives just over 13 inches of rain per year and is classified as a BSk climate in the Koeppen system of climate classification. A BSk climate is a steppe climate, which implies that

evaporation exceeds precipitation and that the annual average temperature is below 64 degrees Fahrenheit. The area generally drains to the southeast. There are no nearby surface waters or 100-year floodplains.

A stormwater detention pond designed to hold the runoff from a 25-year 24-hour storm, will be constructed southeast of the expansion area. Stormwater will be channeled around the active areas to the pond using berms and ditches. After construction of the new pond, the existing pond will become part of the fill area.

There are no active or intermittent streams located on or adjacent to the study area. None of the area is classified as wetland or is located within a 100-year floodplain. The area generally drains to the southwest. The nearest surface waters are approximately one mile to the east of the existing facility.

3.7 Surface Water Impacts

It is anticipated that there will be no changes to the water quality, quantity or distribution. The applicant anticipates that all stormwater will be contained on-site and that no discharge permit will be needed. There are no wetlands or other surface waters at the site.

Surface water impacts are anticipated to be minor. Natural runoff from the area surrounding the landfill facility mostly drains into a pond one mile to the east of the facility where it evaporates. A detention pond will capture all runoff from the landfill footprint. These ponds will have the capacity to contain stormwater from the 25-year, 24-hour storm. A discharge permit will probably not be necessary since all stormwater runoff from the active facility should be detained on site and pond water levels will be lowered as needed by irrigation of final cover on closed areas.

3.8 Hydrologic Evaluation of Landfill Performance (HELP) models

4.0 Vegetation Cover, Quantity and Quality

The proposed landfill expansion site is bordered by grazing lands and oil wells. The existing landfill is to the west. Any plant species in the area proposed for expansion will be permanently displaced by the landfill operations during the life of the landfill expansion. As portions of the landfill is filled to its final elevation, it will be covered with two feet of earthen material, another two feet of soil for frost protection and six inches of topsoil. It will then be seeded with range grasses appropriate to the area as recommended by the Natural Resource Conservation Service. After final closure the entire area will be seeded to the appropriate range grasses to make the area again suitable for wildlife habitat and cattle grazing. In order to assure the integrity of the landfill cover, grazing will likely be restricted for some time after closure to allow the cover vegetation to become fully established and able to withstand grazing pressure. The overall impacts of the expansion construction and operation, and the closure activities will be minor and could be positive if the reclamation vegetation will provide better grazing and habitat diversity than the existing vegetation.

5.0 Aesthetics

5.1 **Visual**

The proposed expansion will likely have only minor, if any, impact on aesthetics because the expansion area is not near any major highways, and is adjacent to the existing landfill. There are no nearby residences or businesses.

5.2 **Litter Control**

All vehicles coming to the facility will be required to have their loads covered and the waste will be covered with earthen material daily. In addition to the hog-wire bottom on the perimeter fence and the portable litter screens, which will catch much of the litter escaping from the waste, the landfill will use hand picking to further control litter on the site. The first few years of operation of the expansion area will be below the existing ground level, which will also serve to control litter and render any impacts from litter to be minor.

6.0 Air Quality

Air quality concerns related to sanitary landfills are frequently associated with increased dust from landfill traffic, construction and maintenance activities and open burning at the site.

Additional traffic on the road to the landfill, related to the construction of the landfill expansion, could cause an increase in the levels of airborne dust. If this occurs, dust suppression methods such as watering the road will lessen the impact. Construction of new landfill cells will cause an increase in internal landfill traffic and could cause an increase in airborne dust during the period of excavation and compaction of the base. Since the construction periods will be short in relation to the operating life of the facility these effects will be minor. If dust from construction were to become a problem dust control measures such as wetting the surface before working on it, will be initiated. Normal operational traffic on the site could cause a minor increase of suspended dust particles in the air during the dry months of the year. If problems develop due to this dust, this effect could be mitigated by adequate dust control measures on the interior roads such as applying a dust palliative or water.

The excavation and placement of cover material could increase the suspended dust in the air. If it became a problem, the cover material could be wetted prior to lay-down so that the net effect will be minor. All long-term soil stockpiles will be seeded to prevent erosion and airborne dust.

Decomposing buried waste can produce varying amounts of methane, depending on the amount of water reaching the waste. A properly constructed cover on the landfill minimizes the amount of water that leaches down to the waste by containing the precipitation so that it may evaporate from the land surface and be transpired by the vegetation growing on it.

Two methane monitoring wells will be added in addition to an existing well, located to the south and southeast of the proposed expansion area. Two previous wells will be abandoned because they are located inside the proposed Class II expansion area. These wells will be monitored quarterly to assure that standards are not exceeded.

Any open burning of clean, untreated, unglued wood will only be done after obtaining an annual open burning permit from the Department. Since burning could only be done on days with good ventilation during the period specified on the permit, and there are no nearby residences, it is anticipated that any impacts will be minor.

7.0 Unique, Endangered, Fragile or Limited Environmental Resources

Although there are species of concern in the general area of Fallon County, the Montana Natural Heritage Program literature search did not find any known unique, endangered or fragile species in the area proposed for development. No intensive site survey was conducted; therefore the impact to these resources is unknown.

8.0 Demands on Environmental Resources of Water, Air and Energy

Energy demands related to landfill operation are primarily due to the hauling of waste to the facility. Lesser demands are from excavation and construction of new cells, and the compaction, covering and other routine landfill activities. Waste is now being hauled to the currently licensed facility and will be hauled to the expansion area, adjacent to the current operation. Construction and operation of the proposed expansion will cause an unavoidable minor increase in fuel use. These energy demands are not expected to impose excessive burdens on environmental resources. Continuing to use the current site will cause considerably less fuel to be used than if the waste were transported to the nearest Class II landfill in Glendive, 71 miles away. This will be a major savings in the amount of fuel used for waste disposal.

9.0 Historical and Archaeological Sites

The State Historical Preservation Office (SHPO) was informed of the plans to expand the landfill at this site. SHPO searched their records and found no documented historical or archaeological sites in the area proposed for landfill activities. This does not mean that there are no such sites in at that location, but that there are no known sites there. The effects on these resources are not known, because the applicant did not submit information on historical or archaeological sites within the proposed site boundary. Since there are known sites elsewhere in Fallon County, the SHPO recommended that a cultural resource survey be conducted prior to ground disturbance and that their office be contacted if any cultural materials are inadvertently discovered during construction or operation of the facility.

II. POTENTIAL IMPACTS ON HUMAN ENVIRONMENT

3. Local and State Tax Base and Tax Revenue

Because construction of the proposed landfill expansion has additional costs to the city, there may be a future increase in the cost of waste disposal. Since there may be additional workers hired during the construction phases of the proposed expansion, construction of the proposed facility could have a minor positive effect on the local tax base because of the additional jobs created during the construction phases.

4. Agricultural and Industrial Production

The area proposed for the landfill expansion is currently only used for grazing. Operation of the facility will have a minor effect on agricultural production by eliminating the possibility of the area being used for grazing during operation of the facility. The possibility for using the reclaimed surface of the landfill for grazing land will be returned after closure activities are completed and the cover vegetation becomes well established.

5. Human Health

It is anticipated that there will be no impacts to human health. The criteria for approval of the no-migration petition protects the groundwater and there are no nearby residences downwind of the facility that will be impacted by dust resulting from operations. Regulations governing the application of daily and intermediate cover keep birds, rodents or other possible disease vectors from having free access to the waste.

7. Quantity and Distribution of Employment

During the construction phases of the expansion there could be a minor positive effect on employment due to the possible increased employment for construction activities. Between construction phases, the landfill will continue to operate with the same number of employees currently working at the facility.

9. Demands for Governmental Services

The potential impact of the proposed facility will be minor. Department personnel must spend time reviewing the proposal and licensing the expansion. The Department will perform inspections of the site during and after construction in addition to continuing the regular inspections that are currently conducted on the operating landfill. During the construction phases, there will be increased traffic on roads leading to the landfill, but the impact is expected to be minor.

10. Industrial and Commercial Activity

Construction of the proposed facility will cause a minor increase in the industrial activity of the area during construction. Since the area is undeveloped rural land with no commercial or industrial activity, no additional on-going impacts to industrial or commercial activity of the area are expected due to this proposed expansion. The landfill will continue to provide a legal and environmentally sound waste disposal option for industrial and commercial establishments in and around Fallon County.

References

Solid Waste Management System License Application, Coral Creek Class II Landfill, September 2004

Coral Creek Class II Sanitary Landfill Expansion Area License Application and Operation & Maintenance Plan, Prepared by Entranco Engineers, Inc., Helena, Montana, October 2004

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Alt, David and Hyndman, Donald W. 1986, Roadside Geology of Montana

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Figure 1: General Location of the Coral Creek Landfill



Figure 2: Aerial photograph of the current landfill site and the proposed expansion area.

